REFERENCE 4

OhioEPA

State of Ohio
Environmental Protection Agency

Division of Emergency and Remedial Response

Site Inspection Report
Behr VOC Plume Site

Montgomery County

January 14, 2008

Bob Taft, Governor
Chris Korleski, Director

SITE INVESTIGATION
(SI) REPORT

Behr Dayton Thermal System VOC Plume Site
Dayton, Montgomery County, Ohio

U.S. EPA ID: OHN000510164

March 20, 2008

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SITE INVESTIGATION
(SI) REPORT

for

Behr VOC Plume Site
Dayton, Montgomery County, Ohio
U.S. EPA ID: OHN000510164

OHIO ENVIRONMENTAL PROTECTION AGENCY
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1.0 EXECUTIVE SUMMARY

The Ohio Environmental Protection Agency (OEPA) Division of Emergency and Remedial Response (DERR) entered into a cooperative agreement with the United States Environmental protection Agency (U.S. EPA) Region V to conduct a Site Inspection (SI) of the Behr VOC Plume Site, located in Montgomery County, Dayton, Ohio. The purpose of the SI was to evaluate ground water conditions at the Site by collecting samples for analytical analysis from wells owned by Chrysler, the city of Dayton, Gem City Chemicals and others. Water level measurements were also collected to provide a snapshot of ground water flow in the area.

The work plan for the SI was approved by U.S. EPA in July 2007. Sampling ground water was conducted on July 16-19, 2007. The samples were analyzed through the U.S EPA Contract Laboratory Program (CLP) for the Target Compound List (TCL) organics, volatile organic compounds (VOCs), only. The SI confirmed that ground water is contaminated with VOCs emanating from the Behr facility and other nearby sources. Contamination extends south of the Behr facility to at least the confluence of the Great Miami and Mad Rivers, known as Deeds Point. To the north/northeast, ground water is contaminated at least to the Dayton Miami Well Field.

The city of Dayton operates two well fields located along the Great Miami River and the Mad River, respectively. The Dayton Miami Well Field is located approximately one mile northeast of the Behr Dayton Thermal Products LLC facility at 1600 Webster Street. The Mad River Well field is located approximately 2 miles southeast of the facility. These two well fields have 102 active wells serving a total population of 440,000. Each public well is pumped at approximately equal rates so each well serves approximately 4300 persons. Trichloroethene (TCE) and cis-1,2-dichloroethene (cis-1,2-DCE) were detected in SI samples collected from Dayton Miami Well Field public production wells PW-14 and PW-15 at concentrations below their respective maximum contaminant levels (MCLs).

Ground water contamination south of the Behr facility is migrating into occupied structures through vapor intrusion at concentrations above U.S. EPA removal action levels established by the Agency for Toxic Substance and Disease Registry (ATSDR) and the Ohio Department of Health (ODH). Exposure of residents to VOCs through vapor intrusion is being addressed through a U.S. EPA Time-Critical Removal Action which began in November 2007. Chrysler Corporation as a responsible party and U.S. EPA are both conducting sampling of occupied structures and mitigation of those structures with concentrations of VOCs exceeding the established removal action levels. Mitigation of these

structures is considered a short-term and temporary solution to eliminate exposure to VOCs. The long-term solution is to clean up contaminated ground water and source areas to eliminate the vapor intrusion exposure pathway.

2.0 SITE BACKGROUND

2.1 Site Description

The Behr Dayton Thermal System VOC Plume Site (the Site) is located at 1600 Webster Street, Dayton, Montgomery County, Ohio. The geographic coordinates are 39° 47' 07.63" latitude and 84° 10' 46.93" longitude, measured to the approximate center of the 1600 Webster Street facility property. The site location is shown in Figure1. According to the plat maps and tax records, the current owner of the property is Behr Dayton Thermal Products LLC. The tax mailing address is 2700 Daley Drive, Troy, MI 48083-1949.

The Behr manufacturing facility is completely fenced and access is highly restricted. Access can be obtained at the security entrance point at mid-facility on Webster Street. Visitors are photographed and issued ID cards. Viewing a safety and orientation video is mandatory before entry. Behr personnel escort visitors throughout the facility. Picture taking is closely monitored.

The Behr manufacturing facility occupies approximately 60 acres on which several buildings are located (approximately 1.4 million square feet under roof), as well as associated parking, outdoor storage areas and landscaped areas. The Behr property is bounded by Webster Street to the west, CSX Rail lines to the east, Stanley Avenue to the north, and Leo Street to the south.

2.2 Site History

The complete history of the Behr facility is unknown, but at least some of the buildings on the property were constructed circa 1907. Prior to Chrysler Corporation ownership, the facility was operated as the Maxwell Motor Company. Chrysler Corporation using various names, operated the facility from 1924 to 2002. In 1936 Chrysler began to manufacture furnaces and commercial air conditioners as Chrysler Airtemp Division. DaimlerChrysler owned and operated the facility as DaimlerChrysler Dayton Thermal Products (Dayton Thermal).

DaimlerChrysler sold plant to Behr in 2002. Behr currently utilizes the plant in much the same manner as DaimlerChrysler, for the manufacture of parts and

sub-assemblies of heating, ventilation, and air conditioning (HVAC) equipment for DaimlerChrysler, and other car and truck manufacturers. The types of vehicle parts produced include such items as auto heater cores and air conditioner coils, radiators, and gasoline vapor canisters. The Standard Industrial Classification (SIC) Code for the plant is 3069. The plant employs approximately 2,500 employees, working three shifts.

The Site is located in a high density mixed use area roughly two miles northeast of downtown Dayton. The site is mostly within the Dayton neighborhood known as the McCook Field Neighborhood. A smaller portion of the Site is in the adjoining Old North Dayton Neighborhood. The Site is located between the Great Miami River which is located to the west, north and northeast, and the Mad River, located to the south. Topography of the immediate area is mostly flat.

2.3 Regulatory Information

The Behr facility is considered a large quantity generator under the Resource Conservation Recovery Act (RCRA). There are no facility environmental clean-up obligations under RCRA jurisdiction. The facility has a NPDES permit for waste water discharges to the Dayton sanitary sewer system. These discharges include waste water generated by the ground water remediation system currently in use. Permits are also in place for airborne emissions from the facility.

2.4 Fall 2006 State and Federal Actions

Dissolved chlorinated volatile organic compound (VOC) constituents that include trichloroethene (TCE) have been found in groundwater south of the Behr facility and also to the west, north and northeast of the Behr facility. Known local sources of VOCs in ground water include the Behr facility, Gem City Chemicals, Inc., 1287 Air City Avenue, DAP, Inc., 220 Janney Road, Gayston Corporation, 55 Janney Road, Aramark Uniform Services, 1200 Webster Street, and the former PermaFix facility, 416 Leo Street. It is likely that other unknown sources of VOCs are in the industrialized area surrounding the Behr facility.

In situ bioremediation and ground water containment are being utilized to remediate the constituents beneath the Behr facility and to prevent further off-property migration. Gem City Chemicals, DAP and Gayston are under orders with Ohio EPA to control or remediate sources of VOC ground water contamination. Aramark conducted remedial activities at it's facility without input from Ohio EPA. Concentrations of VOCs above MCLs continue to be detected in wells south and north of the Behr facility.

In 2003 and 2006, DaimlerChrysler documented elevated levels of VOCs south of the Behr facility. In 2006 concentrations of TCE as high as 3,900 parts per billion (ppb) were reported. In response to the concentrations of VOCs in shallow

ground water and increased awarenes of the threat posed by vapor intrusion, Ohio EPA conducted a soil gas investigation on Daniel Street, Lamar Street and Milburn Avenue in October 2006. Ohio EPA documented elevated levels of TCE in soil gas as high as 160,000 parts per billion by volume (ppbv).

In late October and in November 2006, the U.S. EPA collected sub-slab air samples from eight residences located south of the Behr-Dayton facility along Milburn Avenue,

Daniel Street and Leo Street in the area where Ohio EPA documented elevated soil gas concentrations of VOCs. TCE concentrations as high as 62,000 ppb were detected in the sub-slab samples. ATSDR and the Ohio Department of Health (ODH) established TCE screening and action levels for residential and commercial sub-slab and indoor air. The ATSDR residential indoor air screening level is 0.4 parts per billion (ppb) and the action level is 100 ppb. The ATSDR residential sub-slab screening level is 4 ppb. Samples from all eight residences exceeded the ATSDR residential TCE sub-slab screening level of 4 parts per billion by volume (ppbv).

Based on ATSDR and ODH recommendations, the U.S. EPA followed sub-slab air sampling with indoor air sampling at the eight residences in November 2006. TCE residential indoor air concentrations were detected at a range of 0.4-260 ppb. The results of the EPA indoor air sampling indicated that all eight samples were equal to or exceeded the ATSDR residential TCE indoor air screening level of 0.4 ppbv. Three samples exceeded the ATSDR residential TCE indoor air immediate action level of 100 ppbv.

On December 19, 2006, an Administrative Order by Consent was signed between U.S. EPA and DaimlerChrysler (former owner of the Behr facility) to conduct a vapor intrusion investigation and mitigation. On December 21, 2006, EPA approved the Daimler Chrysler Phase 1 work plan for sampling and installation of residential TCE vapor abatement systems in up to 21 residences along Leo Street, Daniel Street, and Milburn Avenue.

As of March 15, 2007, a total of 14 vapor abatement systems had been installed in the 21 Phase 1 Work Plan locations. Three residents are under a quarterly sampling program, one residence has no further action due to sub-slab and indoor air levels below the screening action levels, two residents have "Best Efforts" achieved and one residence is awaiting results from the pre-mitigation sampling.

On March 16, 2007, the U.S. EPA approved the DaimlerChrysler Phase 2 Work Plan for Indoor Air Sampling Delineation and Mitigation. Phase 2 work includes additional sub-slab and indoor air sampling, and mitigation.

The U.S. EPA removal action is currently investigating the extent of vapor intrusion from a VOC ground water plume from the Behr facility. Structures impacted by vapors above action levels are being mitigated by installation of active venting systems. Currently, the removal action is moving into the McCook Field neighborhood, south of Keowee Street. Early removal action details are described in section 3.2. Updates for the removal action can be found at the USEPA removal Action website. The website address is as follows: http://www.epaosc.net/site_profile.asp?site_id=2642

2.5 Site Geology, Soils, Topography and Hydrogeology

2.5.1 Geology

Montgomery County is covered with extensive deposits of Illinoisan Wisconsin glacial deposits. The site is located on sand and gravel outwash valley train deposits of Wisconsin age overlain by modern river alluvium. These deposits range in thickness from zero feet at the edge of the bedrock valley to a maximum of 230 feet in the center of the river valleys. The unconsolidated materials are coarse sand and gravel with inter-bedded layers of light brown and light gray, clayey and silty tills. Overlying the glacial sediments is a thin veneer of recent alluvial deposits. The Ordovician Richmond Shale formation underlies the glacial deposits and composes the nearby bedrock hills. The Richmond Shale is composed of relatively soft, light gray, calcareous shale with inter-bedded layers of limestone.

2.5.2 Soils

According to the Montgomery County Ohio Soil Survey, soil from the Fox Series originally covered the site. These soils have been disturbed or buried over much of the site. The Fox Series consists of a dark yellowish-brown silt loam plow layer about eight inches thick. The subsoil consists of layers of mainly brown loam, and a reddish-brown and brown sandy clay loam. The subsoil extends to a depth of 29 inches where calcareous sand and gravel occur. Permeability is moderate in the subsoil and is high in the sandy and gravelly substratum.

2.5.3 Topography

The site is relatively flat and lies within the original flood plain of the Great Miami and Mad Rivers at an elevation of approximately 755 feet above sea level.

2.5.4 Hydrogeology

The regional recharge area consists of the entire surface of the buried valley (i.e. the area between the valley's bedrock walls). The Great Miami and Mad Rivers are the primary source of recharge water to Dayton's well fields. Recharge

occurs from leakage through the bottom of river bottoms, nearby lakes, and artificial recharge lagoons. Unpaved areas contribute some recharge to the underlying aquifer as does ground water flow from the upland areas.

The depth to ground water is currently approximately 20 feet below ground surface. Depth to water changes seasonally and during periods of heavy rains or droughts. River levels fluctuations affect ground water levels at the site. Predominant ground water flow is reportedly to the southwest. Flow to the northeast has also been reported and is influenced by river levels, drought or high water table conditions and pumping rates at the Dayton Miami Well field.

The Ground Water Pollution Potential map of Montgomery County shows the site to be located in an area with a Pollution Potential Index over 200. Within Montgomery County, the Pollution Potential Index ranges from approximately 41 to 206. The pollution potential maps are based on a weighted rating system which considers depth to water, net recharge, aquifer media, soil media, topography, impact of the vadose zone media, and the hydraulic conductivity of the aquifer. The pollution potential maps indicate the site is located on land which is highly likely to allow contaminants to reach ground water. The site exhibits a combination of critical factors such as shallow depth-to-ground water, a highly permeable sand and gravel aquifer, and moderately permeable overlying soil material. The site overlies part of an extensive and important regional aquifer which is used for drinking, industrial, and agricultural water supplies.

Several industrial sites which are known to have impacted ground water are also in the area. The Valley Crest Landfill, Van Dyne Crotty, the Brandt Pike Oil Terminals, Gem City Chemicals and Dayton Electroplate are within one-mile of the site.

2.6 Land Use and Demographic Information

Land use in the area is a mixture of residential, commercial and industrial uses. Within 4 miles of the Behr facility, there are approximately 167,661 residents. Approximately 6,900 residents live within 1 mile of the site.

3.0 SAMPLING LOCATIONS & DISCUSSION OF RESULTS

3.1 SI Sampling Locations

Ground water samples were collected from 51 locations on and surrounding the Behr facility. SI sample locations are shown on Figure 7. Sampling locations include Chrysler monitoring wells both on and off Behr property, city of Dayton monitoring wells, Gem City Chemicals monitoring wells and a monitoring well

located at Simclar, Inc., 1784 Stanley Avenue. Production wells were sampled at Mike Sells Potato Chips, 333 Leo Street, and at Eastway Family Center, 1100 Webster Street.

3.2 SI Results

SI results are provided in Appendix A , Complete Analytical Results. TCE is the VOC found most pervasively and at the highest concentrations. Chrysler MW-10S on the southeast side of the Behr property had the highest overall concentration of TCE at 19,000 µg/l. Other contaminants found in ground water include tetrachlorethene (PCE), 1,1,1-trichloroethane (1,1,1-TCA), cis-1,2-dichloroethene (cis-1,2-DCE), and Vinyl chloride. TCE was detected in Dayton production well PW14 at a concentration of 1.4 µg/l. Cis-1,2-DCE was detected in PW-14 at an estimated concentration of 0.42 µg/l and in PW-15 at a concentration of 2.9 µg/l.

MIGRATION PATHWAYS

4.1 Soil Exposure Pathway

The Behr facility is fenced and not accessible to the public. Other known sources of VOCs such as Aramark, Gem City Chemicals, DAP and Gayston are not as secure as the Behr Facility. There are regular workers on these facilities but most of the facilities is paved or covered with buildings making contact with soils unlikely. There are schools within 200 feet of the known ground water plume.

4.2 Groundwater Pathway

Ground water near the site is approximately 20 feet below ground surface. DaimlerChrysler has installed numerous monitoring wells on and off-the Behr facility. Most Off-property wells are to the east and south of the facility. Dayton has monitoring and investigation wells north and northeast of the facility, between it and the Miami Well field. A small number of other private monitoring wells are located in the immediate area such as those at Gem City Chemicals, DAP and Gayston. Monitoring wells at Aramark have been abandoned.

Public ground water systems and wellhead protection areas are within the four mile target distance limit. The majority of the surrounding population obtains their drinking water from the city of Dayton. The Dayton Miami Well Field is located approximately one mile northeast of the Behr Facility. The Mad River Well field is located approximately 2 miles southeast of the facility. These two well fields have 102 active wells serving a total population of 440,000. Each

public well is pumped at approximate equal rates and serves approximately 4300 persons. There are 5 public production wells between one-half to one mile from the Behr facility. 36 public production wells are between one and two miles from the facility and 51 public production wells are between two and four miles of the Behr facility. Public well locations and radii from the Behr facility are shown on Figure 9, Four Mile Radius and Dayton Well Map.

TCE was detected in Dayton production well PW14 at a concentration of 1.4 µg/l. Cis-1,2-DCE was detected in PW-14 at an estimated concentration of 0.42 µg/l and in PW-15 at a concentration of 2.9 µg/l

4.3 Surface Water Exposure Pathway

The distance between the Behr facility and the Great Miami River is approximately 1500 feet. Discharges to the river occur through storm sewers. The Great Miami River is both a known fishery and recreational area. The area is protected by a floodway, maintained by the Miami Conservancy District.

4.4 Air Pathway

VOCs are migrating from ground water to occupied structures. This completed pathway is the subject of the current USEPA time-critical removal action.

SUMMARY

Ground water is contaminated with VOCs at concentrations exceeding MCLs due to releases from several facilities including Behr, Aramark Uniform Services, Gem City Chemicals, Inc., DAP, Inc., Gayston Corporation and PermaFix. TCE and cis-1,2-DCE were detected in Dayton public wells PW-14 and PW-15 during the SI conducted in July 2007 at concentrations below their respective MCLs.

VOCs in shallow ground water are migrating as vapors into occupied structures. Ohio EPA requested that U.S. EPA conduct a time-critical removal action to assess and to mitigate the vapor intrusion pathway. Currently Chrysler and U.S. EPA are both involved with sampling occupied structures and mitigating them if concentrations of VOCs are above action levels established by ATSDR and the ODH. Mitigation of affected structures relies on venting systems similar to radon extraction systems. These venting systems are considered temporary solutions to eliminate current exposure to VOCs. The long-term solution to eliminate exposure to VOCs will be for ground water to be cleaned up so that the vapor intrusion pathway is no longer complete.

Ohio EPA referred the Site to the U.S. EPA Remedial Program for long-term clean up through the RI/FS process. U.S. EPA special notice letters were sent to

Chrysler Corporation, Behr Dayton Thermal Products LLC, Aramark Uniform Services and Gem City Chemicals, Inc. in November 2007, inviting these parties to negotiate an administrative order with U.S. EPA to conduct an RI/FS. Ohio EPA will support U.S. EPA in the RI/FS process.